

Cymbidium 2 pl. 0.711 Eberh.

Dendrobium 4 pl. Eberh.

Eulophia 0.718 Eberh.

Luisia pl. 225 Sim.

Saccolabium 2 pl. Eberh., pl. 14 Simond.

Sarcanthus pl. 0.707 Eberh. plus 1 sans n°.

Tainia 1 pl. Eberh., pl. 223 Sim.

Thrixspermum 0.726 Eberh., esp. nouv. pour l'Indochine.

Trichoglottis 0.738 Eberh.

Vanda 1 pl. Eb., pl. 179, 119 et *bis* Sim.

Plusieurs pl. n'ont pu être placées à leur genre, ce sont : 28 et 172 *bis* Sim. et 0.704 plus 2 pl. sans n° Eberh.

Les pl. inachevées sont numérotées : 54, 68, 69, 93, 123, 133, 134, 135, 137, 155, 156, 204, 209, 210, 213, 216, 217, 221, 224, toutes de SIMOND, les plantes correspondantes ayant été amenées en France, mais ayant péri par manque de chaleur suffisante.

NEW UNITS IN THE TAXONOMY OF THE MADAGASCAN DIOSCOREACEAE

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1. NEW SECTIONAL NAMES.

The classification of the family Dioscoreaceae by the American botanist Edwin B. ULINE, published in 1897 in *Engler's Natürliche Pflanzenfamilien* (Nachtrag zu II-IV, pp. 80-87) and built onto by Dr. R. KNUTH in his monograph of the family (*Das Pflanzenreich*, IV-43, 1924) provides a good foundation for study; but neither of these botanists had much material. The first named, on what he had, defined two sections, *Brachyandra* and *Cardiocapsa* (1); the second added *Madagascarienses*. We add to these four other sections. We find that the island of Madagascar holds 33 species and that there is one in the Comoro islands, not yet found in Madagascar, raising the total for the Malagassy Flora to 34. There are among them :

2 which Man has brought into Madagascar from Asia, *D. alata* L. and *D. esculenta* (Lour.) Burk.;

3 which Man would seem to have brought into Madagascar from

(1) This sectional name was printed as *Cardiocarpa* (p. 83) and then as *Cardiocapsa* (p. 87) in the original publication of 1897. In 1898 a paper by Dr ULINE appeared in *Engler's Botanische Jahrbucher* (xxv) which shows on p. 159 that *Cardiocapsa* was his form and *Cardiocarpa* a mistake that had been introduced in editing.

Africa, *D. bulbifera* L.; *D. minutiflora* Engl. and *D. sansibarensis* Pax;

1 which appears to have reached Madagascar and the Comoro Islands from Africa without the aid of Man, *D. quartiniana* A. Rich. (*D. cryptantha* Baker);

1 certainly of Madagascan origin which has reached the Aldabra Islands, *D. bemarivensis* Jum. et Perr. (*D. lucida* Scott Elliott, non R. Br. and *D. nesiotis* Hemsl.); and

27 which are strictly endemic.

It is not unreasonable to add *D. bemarivensis* to the endemics, making 28 in all. These endemics fall into sections as follows :

Madagascarienses of R. Knuth, *D. arcuatinervis* Hochr. (to which *D. Humblotii* R. Knuth is reduced);

Cardicapsa of Uline, *D. bemarivensis* Jum. et Perr., *D. mamillata* Jum. et Perr., *D. perpilosa* Perr. and *D. proteiformis* Perr.;

Xylinocapsa, a new section, *D. antaly* Jum. et Perr.

Campanuliflorae, a new section, *D. acuminata* Baker (*D. bararum* Perr.), *D. madecassa* Perr. and *D. maciba* Jum. et Perr.;

Brachyandra of Uline, *D. alatipes*, a new species, *D. analalavensis* Jum. et Perr., *D. bemandry* Jum. et Perr. *D. comorensis* R. Knuth, *D. fandra* Perr., *D. heteropoda* Baker, *D. hexagona* Baker, *D. hombuka* Perr., *D. nako* Perr., *D. pteropoda* Boivin, *D. sambiranensis* R. Knuth, *D. soso* Jum. et Perr. (with *D. trichopoda* reduced to varietal state) and *D. trichantha* Baker.

Pachycapsa, a new section, *D. ovinala* Baker.

Seriflorae, a new section, *D. Decaryana* Perr., *D. seriflora* Jum. et Perr. (including *D. ovifolsy* Perr.), *D. lanalarum* Perr. and *D. tsaralanensis* Perr.

The characters which separate the sections lie chiefly in the way in which the tubers are buried, the shape of the perianth, the shape of the capsule and the manner in which the seed is winged. We do not define here the sections in detail for it can be done better in the *Flore de Madagascar* where full descriptions of the species illustrate them; but we desire to make a few observations on the endemic species. These have no features which draw them closely to any African and Asiatic sections; in fact the sections are as endemic as are the species in them. The sections fall into two groups typified by the *Cardiopsae* and the *Brachyandrae*. The *Madagascarienses* are of the group of the *Cardiopsae*; all the others are of the group of the *Brachyandrae*. The species of the first group obtain the protection of overlying soil for their tubers by thrusting them down on relatively long stalks; the second group obtain the same protection by the deep burying of the corm whence the tubers spring, with the consequence that the annual stem struggles up to the light through a greater depth of soil than the stem of the others. A struggle there must be, either of the tubers downwards or of the stem upwards, in order to obtain that depth of soil over the stored food which secures the spe-

cies against destruction by such animals which feed as wild pigs by rooting. The first group has capsules broader than long and the second capsules longer than broad. Concomitantly the seeds in the short capsules are winged all round and the seeds in the elongated capsules have the wing developed towards the base of the loculus.

It is interesting that, in the Madagascan species with the wing developed in the latter way, there is usually a narrow extension of it upwards along the margin of the seed. Such an extension is peculiarly Madagascan.

The differences between the two groups of endemics seem to lie so deep that it is not unreasonable to suggest on that account that when Madagascar became isolated and the endemism began its development the population of *Dioscoreas* which the island held was already split by these contrasts between those two lineages. Then the one lineage branched into *Xylinocapsa* and a lineage for the rest of the second group of which *Pachycapsa* seems to be the youngest section and to have emerged from *Brachyandra* by a postponement of the time of the drying of its capsule walls, for they remain fleshy and keep the young capsule in an almost globose form until near the time of ripening. This behaviour has the interest of similarity to the process by which *Tamus* must have originated from *Dioscorea*; but *Tamus* retains its water-storing fruit walls to the end and a berry results: in the section *Pachycapsa* the fruit walls at the end of their time dry rapidly and produce a functional capsule.

A character common to the four sections, *Campanuliflorae*, *Brachyandra*, *Pachycapsa* and *Seriflorae*, is the minuteness of their flowers. Those of *Xylinocapsa* are rather larger.

All the species of the first four sections grow in the western part of Madagascar where a long dry weather tries the vegetation. There are among them some which occur at sea level and others which reach high altitudes in the Domaine du Centre, as *D. heteropoda* 2500 m, and *D. hexagona* 2300 m. The curious *D. ovinata* reaches 1500 m. Those which ascend highest are not pubescent; but *D. ovinata* and certain species of the section *Brachyandra* possess an interesting pubescence. The hairs of this pubescence are 2-celled; the lower cell is equidimensional; the upper is elongated, indeed sometimes very long, and is always extended into a very fine point. It is always curved, if short only a little curved and it may then be thick-walled; sometimes when it is long the curvatures are irregular and the walls may be so thin that they collapse and the hair is cottony. Such hairs make an effective blanket over the lower surface of leaves and over tender flower buds and young fruits.

As the section *Pachycapsa* contains only one species, *D. ovinata*, and that species is very pubescent, the hairs may be accepted as a character of the section. They occur on several species of the section *Brachyandra*, but not on all, so that they do not characterise this section, though it is right to say that if any species of the *Brachyandrae* has hairs, the hairs will be of the nature described. None of the known species of the

sections *Campanuliflorae* and *Seriflorae* possess them. They recur on two species of the section *Cardiocapsa*, *D. mamillata* and *D. perpillosa*., which like the whole of the *Brachyandrae* and *Pachycapsa*, are species of the western side of Madagascar. Outside the endemics, *D. quarliniana* has such hairs and the area of its distribution in Madagascar is western. It may, in fact, be said in brief that, subject to one uncertainty, such hairs do not occur on the parts of any of the *Dioscoreas* of the *Domaine de l'Est*. The uncertainty relates to *D. bemarivensis* which as it grows in western Madagascar is without hairs of this shape; but Scott Elliott collected a plant, his *D. lucida*, which has them on its inflorescences, both male and female, though not elsewhere; and the locality is given as Fort Dauphin, i. e. in the *Domaine de l'Est*. Unfortunately Scott Elliott's number belongs also to a *Mussaenda*, so that there has been a mistake; and as other collectors have failed to find at Fort Dauphin this rather striking plant, it may be that the locality, which appears an unlikely one, does not belong to the *Dioscorea*.

There is another kind of hair met with on the surface of Madagascan endemics, a very simple hair, being a blunt fingerlike outgrowth of an epidermal cell. Such hairs are largest in *D. antaly* of the section *Xylinocapsa*, and are rather large in *D. maciba* of the section *Campanuliflorae*. They vary in these species down to mere papillae, such papillae as are found on other species giving to the epidermis a roughness. They sometimes occur on *D. bemarivensis* but are not on Scott Elliott's specimens. *D. maciba* belongs to the west of Madagascar; and so too *D. antaly*; but the latter just passes over the border of the *Domaine de l'Est*. There is less of interest in these simple hairs than in the others.

Except on the introduced *D. esculenta* there are no persistent hairs of another shape. The distribution of mucilage-holding collectors has not been worked out. The hairs of *D. esculenta* are T-shaped. No Madagascan species have stellate hairs, as have some very wide-spread species of the continent of Africa.

2. VARIETIES OF *D. soso* Jum. et Perr.

D. soso is one of the most wide-spread of the western *Dioscoreas*, growing in all kinds of soil from sea-level to 1.200 m. It carries the 2-celled hairs that have been described above, but in a variable degree; and this induces us to put forward varietal names based on the amount of pubescence. We observe also other differences and suggest the following;

Inflorescentiae femineae decurvae : capsulae recurvatae ut ad coelum spectant;

Laminae foliorum majorum late lanceolatae;

Indumentum sparsum et fugax..... var. *calvescens*.

Indumentum densum et tenax..... var. *mollis*.

Laminae foliorum majorum ovatae; indumentum densum praecipue circa flores, sed in foliis aliquo modo fugax..... var. *trichopoda*.
Inflorescentiae femineae ascendentes; capsulae prorsae et ad coelum plus minusve spectantes..... var. *prorsicarpa*.

Typical specimens of var. *calvescens* are Perrier 15920 and 17839; of var. *mollis* Grevé 130; of var. *trichopoda* (*D. trichopoda* Jum. et Perr. in Ann. Mus. Col. Marseille Ser. 2, VIII, 1910, 401) Perrier 1393 and 8204; and the type of var. *prorsicarpa* is Perrier 11518 from the Mahafaly plateau in the Domaine du Sud-ouest.

3. *Dioscorea antaly* Jum. et Perr., var. *laevis*, var. nov.

The hairs of *Dioscorea antaly* have been described above as blunt finger-like outgrowings of epidermal cells. They vary in length up to half a millimetre and the longest of them line the largest of the nerves on the lower side of the leaf; the nerves being prominent, they are most conspicuous. As epidermal cells they have no coloured contents and on the dried leaf under magnification stand out as almost white points. They are constant enough in *D. antaly* to make a single leaf enough by which to identify the plant; but every now and then they are absent. Plants in which this is so we call var. *laevis*.

Folia infra laevia, capillis carentibus..... var. *laevis*.

The type is Perrier 12503 from Midongy (Ouest) in the Domaine de l'Ouest, where it grows with typical *D. antaly*. Baron also collected this variety, his no. 4795, but failed to indicate his locality.

4. A PECULIAR DEVELOPMENT OF THE CYMULE OF *Dioscorea heteropoda* Baker.

In the cymule which characterises so many of the *Dioscoreas* of Madagascar, it is usual for the flowers to be brought successively to a more or less uniform distance from the axil in which the cymule arises, that is to say, the pedicel of each flower in the succession may be expected to be shorter than that of the flower before it by just so much as the bract of its origin is above the bract preceeding. But in *D. heteropoda* we have observed in a specimen collected by Decary, No. 16508 from the Nature Reserve of Zahamena on the eastern edge of the Central Plateau a disproportion between the pedicels, those after the first failing to raise their flowers to the level of the first, the result being a lax appearance.

Pedicelli cymularum dispares; flos primus conspicue extrusus (ad 2 mm.); folia sub-herbacea..... var. *diffusa*.

5. A NEW SPECIES, *D. alatipes*, AND CERTAIN VARIETIES OF THE ALLIED *D. hombuka* Perr.

Dioscorea alatipes, sp. nov. Planta intricata omnino glabra. Rami crassiores horizontales, at remote apicem versus sinistrorsum volubiles.

Folia majora ovato-cordata, subquinelobata. Inflorescentiae ex axillis abrupte deflexae, singulae, dimidio basali pedunculum alatum suppediantes, dimidio apicali dense floriferae quasi amenta. Propter has partes *D. alatipes* ab *D. hambuka* prima scrutatione distinguitur.

Foliorum lamina ad 4×5 cm., lobo medio quam auriculis lobisque lateralibus multo majori, margine anguste recurvo, nervis primariis solum distinctis; petiolus ad 2 cm. longus. *Pedunculus* 1-1,5 cm. longus, bi- vel tri- alatus, alis ad 1,5 mm. latis; alae quaeque de bractearum appositarum basi ortae. *Bractae* sat latae, ad 4×3 mm., sed superiores minores, margine saepe incisae, fere cymulas obtegentes. *Cymulae* 2-4-florae. *Gemmae* ellipsoideo-globosae. *Pedicelli* alati, modo pedunculorum at minime. *Flores* cyathiformes, diametro 1,4 mm.; perianthii lobi breviter innixi, ovati, obtusi, interiores obtusiores. *Stamina* 6, os floris vix attingentia.

DOMAINE DU SUD-OUEST — Tongabory, vallée de l'Onilahy, à moins de 200 m. d'altitude, *Humbert* 20157.

D. alatipes differs from *D. hambuka* not only in the crowding of its male flowers on an axis which is distinctly differentiated into peduncle and flowering part and in the degree in which the sterile part is winged, but in the outline of the leaves. The leaf blade in *D. hambuka* is unusual in that it has two lateral lobes removed from the neighbourhood of the petiole and extended laterally; but the outline of the leaf of *D. alatipes* is more distinctly auriculate in the manner of a cordate leaf.

We have thought it well to define two varieties of *D. hambuka*, one of which (var. *ataza*) approaches *D. alatipes*, but the other is divergent from both species. They may be defined thus :

Foliorum majorum lamina ovato-hastata, basi fere truncata, ampliationibus rotundatis nec enim modo foliorum cordatorum sed patentibus;

Inflorescentiae plus minusve erectae..... *D. hambuka*, vera

Inflorescentiae abrupte deflexae more *D. alatipedis*, ramosae,

fertiles fere ab origine floribus dispersis..... var. *ataza*.

Foliorum majorum lamina lata aequae ac longa, irregulariter trilobata; inflorescentiae eis var. *atazae* similes..... var. *Seyrigii*.

The type of var. *ataza* is *Humbert* 13150 from the water-catchment of the Manambolo river, in the vicinity of the Isomono, a tributary through the Sakamolio; and its vernacular name is recorded as 'ataza' The type of var. *Seyrigii* is the late M. Seyrig's no. 499 from 'les rochers du Belambo vers 1.300 m. d'altitude', a very considerable height.